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## **CNS/AD Client for IOS**

### **Program Plan**

#### **Project Headline**

This document specifies the activities and milestones for implementing the Cisco Networking Services client component on IOS platforms as part of the Cisco's Directory Services product, scheduled for the IOS 12.0(5)T commit.

### Reviewers

<i>Department</i>	<i>Name and Title</i>	<i>Date</i>
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Product Marketing	Vijay Parthasarathy, NSMBU	
Customer Advocacy	N/A	

### Modification History

<i>Revision</i>	<i>Date</i>	<i>Originator</i>	<i>Comments</i>
1.0		Fan Jiao	1 <sup>st</sup> draft
1.1		Fan Jiao	Final

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## Definitions

The following list describes acronyms and definitions for terms used throughout this document.

<i>Name</i>	<i>Description</i>
AD	Microsoft's Active Directory
API	Application Program Interface
ARF	Automated Regression Factory
CDSI	Cisco Directory Services Interface
CNS	Cisco Network Services
CNSESCAP	CNS Event Service Client Applications
CNSESCAPI	CNS Event Service Client API
CNSGPOAPI	CNS Global Policy Object API
CNSKCPAPI	CNS Kerberos Change Password API
ENA	Extended Network Architecture
FCS	First Customer Ship
GPO	Global Policy Object
GPORS	Global Policy Object Resolver Service
GSS-API	Generic Security Service Application Program Interface
IOS	Internetwork Operating System
KCPP	Kerberos Change Password Protocol
LDAP	Lightweight Directory Access Protocol
PAC	Privilege Attribute Certificate
SSPI	Security Support Provider Interface
TCO	Total Cost of Ownership



## **1 Abstract**

CNS IOS Client for IOS was initially released in the previous release, IOS 12.04(T). It consists of the following features:

- LDAP V3 implementation
- CNS Locator Service API
- CNS Event Service Client API

This program plan describes the development effort for CNS IOS Client for IOS 12.05(T) release. The release is intended as a follow-up release for 12.04(T) with the following new features:

- **CNS GPO API and IPSec Policy Agent**

Group Policy allows an organization to reduce their TCO by allowing administrators to define centralized policies and applying them to groups of objects using the infrastructure provided by Cisco Directory Services. CNS GPO Resolver Service impersonates an IOS client to retrieve and send back policy information from Directory Services, requested by the IOS client through use of GPO API.

- **CNS Configuration Notify Agent**

The Configuration Notify Agent will send event as soon as the running configuration of an IOS device gets changed. This is very useful especially for some Network Service Management applications that are sensitive to configuration changed events.

- **CNS Provision Agent**

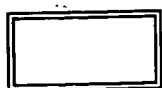
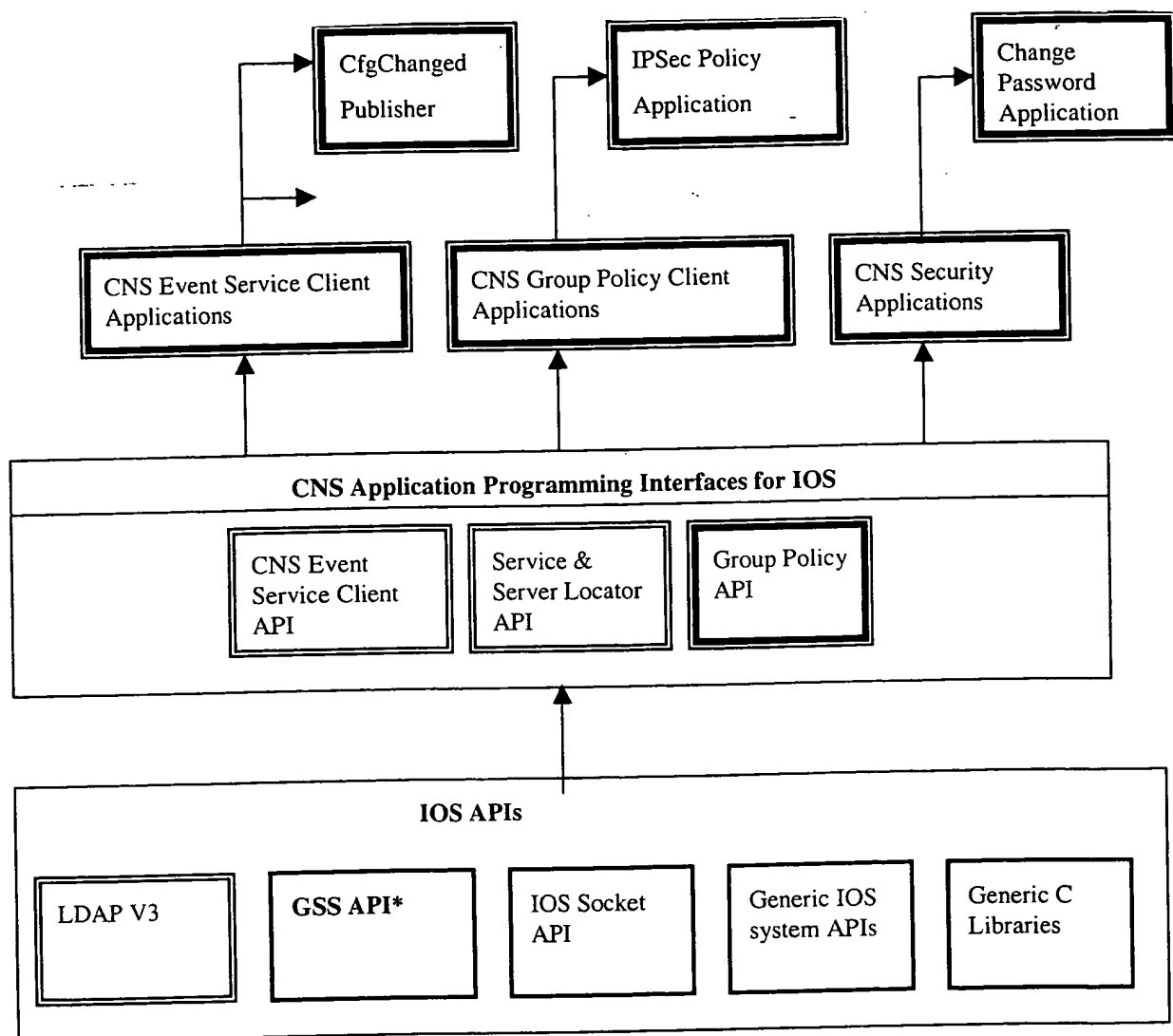
The Provision Agent provides a generic, secured and reliable way to deliver CLI commands to the running configuration of an IOS device. This feature is wanted by various ISP customers including Telstra.

Figure 1 shows those components and interfaces in IOS.

CNS IOS Client for IOS in 12.05(T) continues to add infrastructure (APIs) for CNS. It also have a couple of IOS client applications. Some of the IOS applications that will make use of those APIs are:

- Policy-based Security Management
- CNS Policy-based QoS/CoS for GSR/ISP devices
- CNS Fault Management for Cisco NASes, H323, and/or Cable Modems
- CNS Policy-based VPN implementation

Figure 1: CNS IOS Components in IOS Classic 12.04T/12.05T



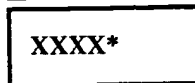
12.04(T) Feature



12.05(T) Feature



Prior 12.04(T)



Prior 12.04(T) plus some 12.04(T) enhancements



## **2 Objectives**

### **2.1 Project Priority**

The objective of this project is to deliver the CNS client capability on the Cisco platforms by Q2/99 as part of the Cisco Directory Services product for IOS Classic 12.05(T) release.

### **2.2 Production Standard Costs**

N/A

### **2.3 Production Forecast**

N/A

### **2.4 Software Memory Estimates**

100K

### **2.5 Hardware Memory Options**

N/A

### **2.6 Key Project Deliverables**

- Deliver IOS images on all IOS platforms.
- Deliver the IOS Programmer's Guide for CNS APIs.

### **2.7 Key Features**

- CNS GPO API & IOS GPO IPSec Agent
- CNS Configuration Notify Agent
- CNS Provision Agent

### **2.8 Features Not Supported**

N/A

### **2.9 Proformance**

TBD

### **3 Development Approach**

CNS IOS Components team will provide platform-independent API code, and build IOS specific subsystem objects. IOS application will link with those code.

## **4 Product Development Activities Entry/Exit Criteria**

### **4.1 Strategy & Planning Phase Criteria**

This was performed as part of the CNS/AD Directory Service Program.

### **4.2 Excution Phase Criteria**

#### **4.2.1 Design Criteria**

- Reviewers and impacted groups notified (Entry)
- Email alias set up for cross BU project team communication (Entry)
- Software Unit Functional and Design Specifications approved (Exit)

#### **4.2.2 Product Implementation/Coding Criteria**

- Design validated (Entry)
- Unit Testing complete (Exit)
- Code Reviews complete (Exit)
- Software Unit Functional and Design Specification reviewed (Exit)

#### **4.2.3 Internal Verification Entry Criteria**

- Test Plans reviewed/approved (Entry)
- Test Designs complete (Entry)
- Review of Unit Test Results (Entry)
- Test coverage and results reviewed (Exit)
- System Integration Test with IOS complete (Exit)
- CNS Programmer's API Guide for IOS complete (Exit)

#### **4.2.4 Code Commit to Mainline Criteria**

- Zero unresolved sev 1 & 2 defects (Entry)
- Test suites automated (Entry)

#### **4.2.5 External Validation Criteria**

- External test plans reviewed and approved (Entry)
- Feature and Integration Tests complete (Entry)
- Regression Test complete (Exit)

- Zero unresolved sev 1 & 2 defects (Entry/Exit)
- Automated test scripts submitted to ARF (Exit)

### **4.3 Deployment Phase**

- FCS Release criteria met (Entry)
- Post Project Assessment meeting (Entry + 3 months).

## **5 Key Development Tasks**

### **5.1 H/W Development Tasks**

N/A

### **5.2 S/W Development Tasks**

#### **5.2.1 Access to CNS VOB**

Every IOS DE who works on the project should be able to access to CNS VOB to be able to view the source code of APIs.

#### **5.2.2 Process for the IOS Build**

The process established in 12.04(T) will be used to build IOS objects in CNS VOB. The process will be communicated to every DE (CNS or IOS).

#### **5.2.3 CNS GPO Resolver Service**

Group Policy allows an organization to reduce their TCO by allowing administrators to define centralized policies and applying them to groups of objects using the infrastructure provided by Cisco Directory Services. CNS GPO Resolver Service impersonates an IOS client to retrieve and send back policy information from Directory Services, requested by the IOS client through use of GPO API. This is an NT service/daemon running in a NT5 workstation based on the “CNS/AD GPO Resolver Service and API for IOS – Software Unit Functional Specification” (ENG-29745). This daemon has been implemented and unit-tested under NT5, and so is the API.

#### **5.2.4 IOS IPSec GPO Policy Agent**

This is an IOS GPO client for IPSec policy. It will use the CNS GPO API to communicate policy information between Directory Service and an IOS device. It is an essential piece of software required for *Cisco-Powered* VPN implementation.

#### **5.2.5 Configuration Notify Agent**

This is a small agent that listens to any attempts to change the running configuration.

#### **5.2.6 Provision Agent**

This agent will play an important role in *Cisco-Powered* VPN implementation.

### **5.3 Network Management Tasks**

#### **5.3.1 SNMP Enhancements**

N/A

#### **5.3.2 MIB Enhancements**

N/A

### **5.4 Test Engineering Tasks**

- Automate any CNS IOS 12.04(T) feature test scripts and submit to ARF
- Set up test bed for Kerberos Change Password
- Set up test bed for GPO/IPSec GPO client
- Integration testing for GPO/IPSec GPO client
- Integration testing for Configuration Notify Agent
- Integration testing for Provision Agent

### **5.5 Diagnostic Development Tasks**

N/A

### **5.6 Mechanical/Power Development Tasks**

N/A

### **5.7 Compliance Test Tasks**

#### **5.7.1 Agency Regulatory Approvals**

- Compliance testing for the regulatory approvals

Regulatory Approval	Requirement
PTT/Network Certification	none
Safety	none
Emissions	none
EMC	none

#### **5.7.2 Standards**

- Verification testing for the standards compliance
- PTT/Network Certification shall include harmonized standards, Common Technical Requirements (CTRs) and any other means to be used in achieving compliance with the requirements of the European Directive 91/263/EEC

- The PTT/Network Certification department is responsible for determination of the appropriate PTT/Network Certification test requirements. In particular, the BABT Approvals Liaison Engineer (ALE)/Deputy Approvals Liaison Engineer(DALE) in the PTT/Network Certification department are responsible for authorizing these requirements.

Standards	Requirement/Revision Level
CCITT/ITU	none
ANSI	none
IEFT	none
RFC	draft-ietf-cat-kerb-chg-password-02.txt
ETSI	none
BELLCORE	none
CTRs*	none
NETs*	none

\* The PTT/ Network Certification department will supply the appropriate CTR and NET Standards.

## **6 Program Risks and Interdependencies**

### **6.1 Resource Contentions**

There is yet no testing resource located for both unit testing and integration testing of Kerberos Password Change and GPO API/IPSec client including setting up both test beds.

### **6.2 External Dependencies**

This project depends on both IOS implementations for Kerberos Password Change and IPSec GPO client by IOS Network Protocol/Security Engineering group. The project also requires unit testing and integration testing for both features by the same team.

### **6.3 Technological Risks**

None so far

### **6.4 Other Risks**

The current estimate of code size is about 100K. Every effort will be made to reduce the code size, but it is not known at the time of writing how much it can be reduced. This may be a major issue for low end platforms.

## **7 Exceptions to Development Methodology**

Although there is no formal PRD for this project, CNS marketing has collected many customer's inputs that are being used to determine the features of this project.

## **8 Resource Requirements & NRE**

### **8.1 Engineering Staffing**

<b>Name</b>	<b>Function</b>
Fan Jiao	Project Manager
Gene Peterson	Target Release Program Manager
N/A	Hardware Manager
N/A	Hardware Engineer
N/A	Product Support Engineer
Fan Jiao (CNS) Don Wooton (CNS Dev Test) Peter Haig (IOS) Dalia Geller (IOS)	Software Managers
David Bleazley (IOS) Silvana Zdravkov (IOS) Allen Long (IOS) Simon Zhao (CNS) Arvind Jamwal (CNS) Fan Jiao (CNS) Tony Zhang (CNS Dev Test)	Software Engineers

### **8.2 Non-Engineering Staffing**

<b>Name</b>	<b>Function</b>
Vijay Parthasarathy	CNS Marketing
Dave Cavanaugh (IOS)	SW Documentation contact
N/A	HW Documentation contact
N/A	CE contacts

### **8.3 Engineering Expenses Summary**

<b>Development Expense</b>	<b>Cost</b>
Prototypes	N/A
Support equipment expenses	N/A

Capital, test equipment	\$15,000
Capital, systems	\$15,000
Agency	N/A
Outside services	N/A
Total	\$30,000

### 8.3.1 Equipment Costs

Equipment List	Qty	Cost	Use and disposition
C2500	2	2K	GPO IPSec test
C4700	2	6K	ChangePassword test
C7500	1	7K	Event Service app test
Pentium II PC	3	15K	GPO Resolver Service Server ChangePassword test Event Service Server

## 9 Schedule

MILESTONE	ORIGINAL PLAN	CURRENT FORECAST	COMMENTS
Program Plan			
Resource Committed			
SW Unit Func Specs Complete			
SW Unit Func Specs Reviewed			
CNS Components integrate to IOS			
SW Design Specs Complete			
SW Design Specs Reviewed			
Test Specs Complete			
Test Specs Reviewed			
Code Complete			
Unit Test Complete			
Integration Complete			
12.05 Commit			
Integration/System Test Complete			

EFT USWest			
EFT MCIWorldCom			
Automated Test Scripts Complete			
Test Scripts submitted to ARF			
CNS Programmer's API Guide Review Complete	TBD		
Begin EFT	TBD		
Begin Beta Test	TBD		

## **10 References**

- [1] IOS CNS/AD Client Program Plan, Ulrica de Fort-Menares, ENG-23055
- [2] IOS CNS Event Services Client System Software Functional Specification, Dennis Lau/Fan Jiao, ENG-28376
- [3] CNS/AD GPO Resolver Service & API Software Unit Functional Specification, Arvind Jamwal, ENG-29745
- [4] Kerberos Change Password Protocol, M. Horowitz, draft-ietf-cat-kerb-chg-password-02.txt